

CLAIMS

1. A reflection type ion attachment mass spectrometry apparatus comprising a metal ion generation region in which positively charged metal ions are generated and an attachment region in which the metal ions attach to molecules of a measured gas to generate attached ions and a mass spectrometry region in which mass spectrometry of said attached ions is performed, wherein:

said metal ion generation region and said mass spectrometry region are formed as a common compartment,

said attachment region is provided adjoining said common compartment, and

said attachment region is provided with an electrostatic field generating means for forming an electrostatic field for reflecting said metal ions introduced from said metal ion generation region so as to guide the metal ions to said mass spectrometry region.

2. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein a translational energy of said metal ions is reduced by reflection.

3. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein the attached ions are accelerated and concentrated by said electrostatic field reflecting said metal ions.

4. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 2, wherein the attached ions are accelerated and concentrated by said electrostatic field reflecting said metal ions.

5. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein said electrostatic field generating means forms an electrostatic field without using a grid where said metal ions or said attached ions pass.

6. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 2, wherein said electrostatic field generating means forms an electrostatic field without using a grid where said metal ions or said attached ions pass.

7. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein a correction field is superposed on the electrostatic field to adjust the paths of said metal ions and attached ions.

8. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein the distribution of intensity of the electrostatic field is of axially symmetric ellipsoid.

9. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein the distribution of intensity of the electrostatic field is spherical.

10. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein a partition having an aperture for introducing said metal ions from said metal ion generation region to said attachment region and an aperture for transporting said attached ions from said attachment region to said mass spectrometry region is provided between said attachment region and the region of said metal ion generation region and said mass spectrometry region.

11. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 1, wherein a partition having an aperture for introducing said metal ions from said metal ion generation region to said attachment region and transporting said attached ions from said attachment region to said mass spectrometry region is provided between said attachment region and the region of said metal ion generation region and said mass spectrometry region.

12. A reflection type ion attachment mass spectrometry apparatus comprising a metal ion generation region in which

positively charged metal ions are generated and an attachment region in which the metal ions attach to molecules of a measured gas to generate attached ions and a mass spectrometry region in which mass spectrometry of said attached ions is performed, the apparatus further comprising:

a reflection type structural member introducing said metal ions to said attachment region, causing said metal ions to attach to molecules of measured gas to generate the attached ions while reflecting said metal ions at said attachment region, and ejecting said attached ions from said attachment region and performing mass spectrometry on said attached ions by a mass spectrometer, and

an aperture by which said metal ions enter said attachment region and an aperture by which said attached ions are ejected from said attachment region being the same common aperture.

13. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 10, wherein a path of said metal ions before entering said common aperture and a path of said attached ions after departing from said common aperture are separated by an electric field or magnetic field.

14. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 13, wherein the distribution of the electric field of said attachment region is made a sphere centered on said common aperture.

15. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 12, wherein a supersonic jet is formed in said attachment region.

16. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 13, wherein a supersonic jet is formed in said attachment region.

17. The reflection type ion attachment mass spectrometry apparatus as set forth in claim 14, wherein a supersonic jet is formed in said attachment region.